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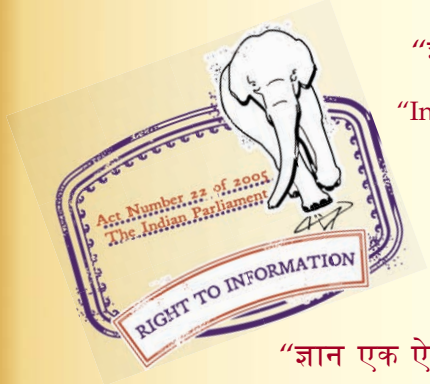

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"Knowledge is such a treasure which cannot be stolen"

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श्रव्य आपात निर्वातन संकेत — विशिष्टि

Indian Standard

AUDIBLE EMERGENCY EVACUATION SIGNAL — SPECIFICATION

UDC 654'92 : 534'6

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1993

Price Group 3

NATIONAL FOREWORD

This Indian Standard, which is identical with ISO 8201 : 1987 'Acoustics — Audible emergency evacuation signal', issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of the Acoustics Sectional Committee (LT 5) and approval of the Electronics and Telecommunication Division Council.

The text of the ISO standard has been approved as suitable for publication, without deviations as Indian Standard. Certain conventions are however not identical to those used in Indian Standards; attention is especially drawn to the following:

a) Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standard, the current practice is to use a point (.) as the decimal marker.

NOTE — Wherever the word 'tactile signal' appears, it should not be considered as presently in India, tactile signals are not in common use.

Wherever the word visual signal appears, it should be considered as a 'flash light'.

CROSS REFERENCES

International Standard	*Indian Standard*	*Degree of Correspondence*
IEC Pub 651 Sound level meters	IS 9779 : 1981 Specification for sound level meters	Technically equivalent

The technical committee responsible for the preparation of this standard has reviewed the provision of the following ISO standard and has decided that it is acceptable for use in conjunction with this standard:

ISO 7731 Danger signals for work places — Auditory danger signals

Indian Standard

AUDIBLE EMERGENCY EVACUATION SIGNAL — SPECIFICATION

0 Introduction

There has been growing interest in the past decade in the development of an international audible signal which, when heard, would unequivocally mean "evacuate the building immediately".

In searching for an appropriate audible signal, it was considered that levels of background noise and frequency patterns are so variable, particularly in industry, that no signalling device would be able to "penetrate" all background noises and frequency patterns. For this reason it seemed prudent to select the kind of sound best able to "penetrate" audibly a particular background noise pattern in a given building and then to make that sound unique and understandable by imposing on it a standard recognizable pattern of "on" and "off" times.

Frequently it will be found that whatever sounding device is already in place in the building is there because it has been shown to be successful in "penetrating" the background noise inside that building. Consequently, all that will be needed in many cases is to impose a standardized temporal pattern on the existing sounding devices. For new buildings a signal should be selected which can "penetrate" the background noise inside that building and then impose the standardized temporal pattern on that signal.

An additional advantage of using a standardized temporal pattern as the distinguishing characteristic of the audible emergency evacuation signal is that the temporal pattern can be applied to visual and tactile signals to aid those who have impaired hearing. Visual and tactile signals incorporating the temporal pattern can also be applied in areas where the background noise is so intense that no signal is capable of "penetrating" audibly.

This International Standard is one of a series of international standards covering danger signals.

For information some examples of application of temporal patterns to commonly used signals are given in an annex.

1 Scope

This International Standard applies to an audible emergency evacuation signal. The signal shall be used for, and limited to, situations requiring immediate evacuation from a building because of an emergency. When sounded, the signal shall indicate imminent danger and signify unambiguously that evacuation from the building is immediately necessary. The signal may also be applied to outside areas when required by the authority having jurisdiction.

This International Standard specifies two parameters of the audible emergency evacuation signal, i.e. the temporal pattern and the required sound pressure level at all places within the intended signal reception area. In order for the audible emergency evacuation signal to be recognizable, it is not necessary to specify the spectral content of the signal. The spectral content of the signal should be selected to satisfy specific site requirements and/or national regulations.

This International Standard applies to the audible signal and not to the individual signalling system components.

This International Standard does not apply to warning signals, to situations covered by national regulations for public disaster control, alarm systems on board ships or to signals from all outdoor moving vehicles, such as police cars, fire engines and ambulances.

2 Field of application

The audible emergency evacuation signal is intended to draw the attention of all persons within the signal reception area to an emergency situation (fire, gas leaks, explosion, nuclear radiation, etc.) requiring immediate evacuation from the premises. This International Standard also applies to signals intended for use in structures where people may be present, day or night, such as schools, hotels, residential buildings, public institutions and work places (including factories and offices).

3 References

ISO 7731, *Danger signals for work places — Auditory danger signals.*

IEC Publication 651, *Sound level meters.*

4 Requirements for the audible emergency evacuation signal

4.1 General

The audible emergency evacuation signal shall only be used for evacuation. Its use shall be restricted to emergencies where it is desired to have all the occupants in the signal reception area evacuate the building immediately.

Where the evacuation plan requires sequential evacuation with only the affected zones or floors having to be immediately evacuated, the audible emergency evacuation signal shall only be used for the zones or floors to be immediately evacuated. It shall not be used when, with the approval of the authority having jurisdiction, the planned action during an emergency is not evacuation, but relocation of the occupants from the affected area to a safe area inside the building or for their protection in the place where they find themselves (e.g. high-rise buildings, health care facilities and penal institutions).

4.2 Temporal pattern

The audible emergency evacuation signal shall consist of a "three-pulse" temporal pattern applied to any appropriate sounding device, preferably by means of central control. The pattern shall consist of an "on" phase (*a*) lasting 0,5 s ± 10 % followed by an "off" phase (*b*) lasting 0,5 s ± 10 %, sounded for three successive "on" periods, then followed by an "off" phase (*c*) lasting 1,5 s ± 10 % (see figure 1). The signal shall be repeated for a period appropriate for the purposes of evacuation of the building but for not less than 180 s. Some examples of how the temporal pattern may be imposed on commonly used sound signals are shown in the annex.

A single-stroke bell or chime sounded at "on" intervals lasting 1 s ± 10 % with a 2 s ± 10 % "off" interval after each third "on" stroke shall be acceptable (see figure 5).

NOTE — The examples given for frequency shift [see figures 3a), 3b), 4a) and 4b)] may be preferred in those countries where electronic sounders are used for the design of future systems unless specific psychoacoustic or technical reasons require other solutions, such as amplitude or frequency modulation of the "on" pulse.

4.3 Recognition

In order to avoid possible confusion, it shall be ensured that the character of the "three-pulse" audible emergency evacuation signal can clearly be distinguished from other signals (e.g. alarm signal) used in the signal reception area (see ISO 7731).

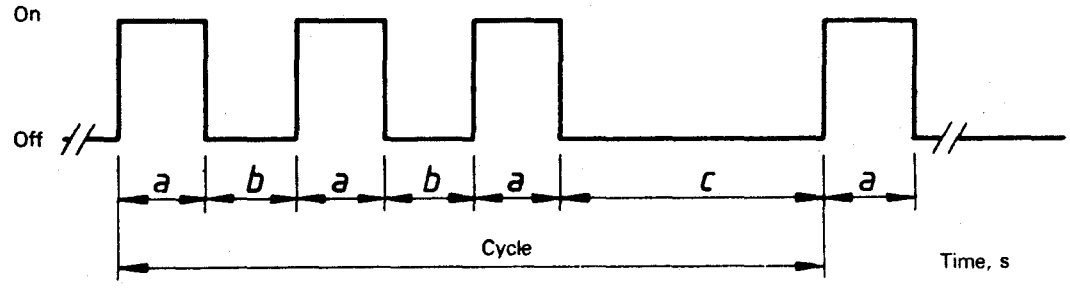
If, during an emergency, an alarm signal is used to alert the occupants in zones or floors which are not going to be evacuated, the alarm signal shall also be significantly different from the "three-pulse" character of the audible emergency evacuation signal.

4.4 Sound pressure level

At all places within the signal reception area, the A-weighted sound pressure level during the "on" phases of the audible emergency evacuation signal, measured with the time-weighting characteristic F (Fast) (see IEC Publication 651), shall clearly exceed the highest A-weighted sound pressure level of the background noise averaged over a continuous period of 60 s and shall not be less than 65 dB (see ISO 7731). Additional visual and tactile signals shall be provided to back up the audible emergency evacuation signal if the averaged A-weighted sound pressure level of the background noise is higher than 110 dB. The temporal pattern described in 4.2 shall be imposed on the visual and tactile emergency evacuation signals.

If the audible emergency evacuation signal is intended to arouse sleeping occupants, the minimum A-weighted sound pressure level of the signal shall be 75 dB at the bedhead with all doors closed.

NOTE — This signal level may not be adequate to awaken all sleeping occupants.



Key

Phase *a* signal is "on" for 0,5 s ± 10 %

Phase *b* signal is "off" for 0,5 s ± 10 %

Phase *c* signal is "off" for 1,5 s ± 10 % ($c = a + 2b$)

Total cycle lasts for : 4 s ± 10 %

Figure 1 — Temporal pattern

4.5 Duration

The duration of the audible emergency evacuation signal shall correspond to the period of time appropriate for the evacuation of the building or outdoor area, but shall not be less than 180 s.

It shall be possible to silence periodically the audible emergency evacuation signal by interrupting the signal for 10 s or less for the purpose of occupant voice communication or for orientation of the blind and visually impaired.

4.6 Supplementary instructions

A key word or phrase (e.g. FIRE !, GET OUT, etc.) may be inserted for supplementary instruction during the "off" phase *c*.

The key word or phrase shall be entirely contained within the specified time limit *c* (see figure 1).

5 Visual and/or tactile signals

The audible emergency evacuation signal may be supplemented by visual and/or tactile signals using the same temporal pattern described in 4.2 for the assistance of those people whose hearing is impaired or in situations where the A-weighted sound pressure level of the background noise exceeds 110 dB (see 4.4).

Annex

Examples of the application of the temporal pattern to commonly used audible signals

(This annex does not form an integral part of the standard.)

This annex outlines some examples of the application of the temporal pattern to audible signals in common use.

Example 1 (see figure 2)

Temporal pattern imposed on signalling equipment that emits a steady sound, such as a single frequency (tone) or a combination of two or more frequencies when actuated (electromechanical horns, buzzers, vibrating bells and electronic sounders).

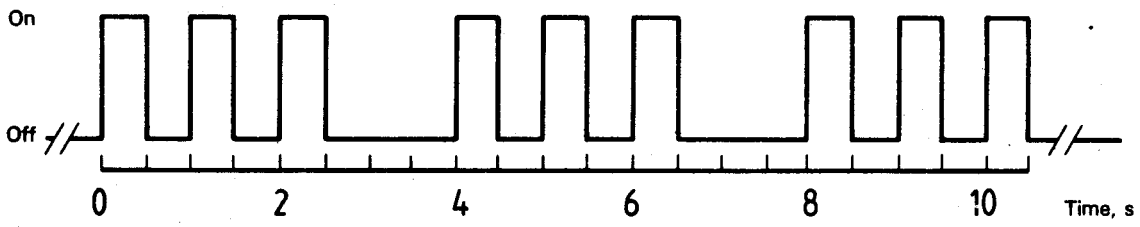


Figure 2 — Example 1

Example 2 [see figures 3a) and 3b)]

Temporal pattern imposed on electronic sounders emitting sweep frequency or saw-tooth tones.

NOTE — In figure 3a), the signal frequency begins with the higher frequency (f_2) and falls to the lower frequency (f_1) within one pulse phase [and vice-versa for figure 3b)].

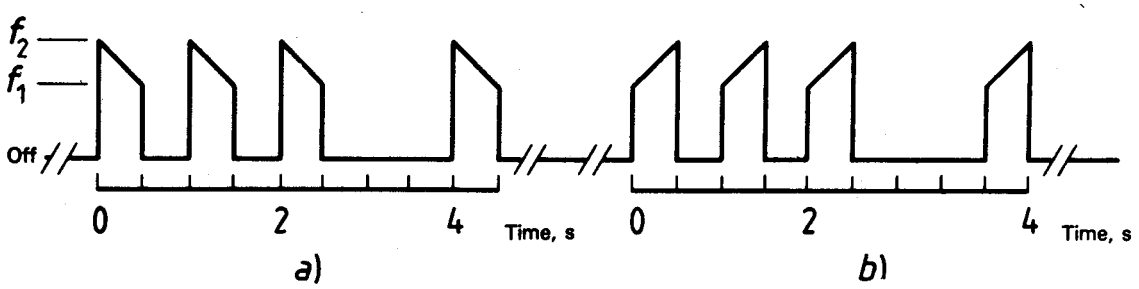


Figure 3 — Example 2

Example 3 [see figures 4a) and 4b)]

Temporal pattern imposed on electronic sounders emitting a two-tone high-low or low-high signal.

NOTE — In figure 4a), the signal frequency begins with the higher frequency (f_2) for part of the "on" pulse phase and ends with the lower frequency (f_1) for the remainder of the pulse [and vice-versa for figure 4b)].

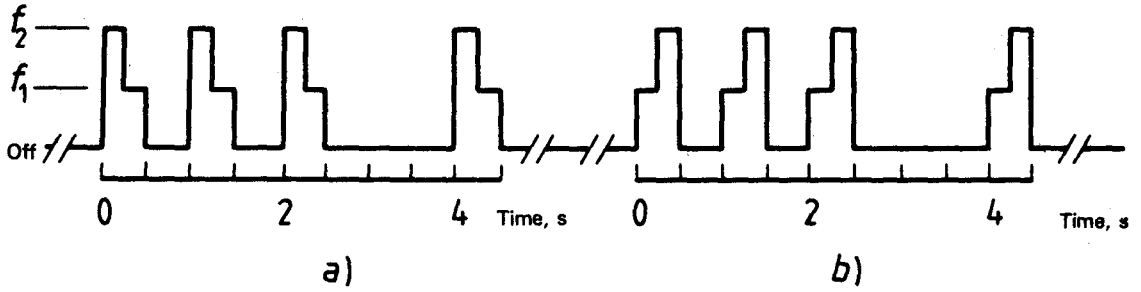


Figure 4 — Example 3

Example 4 (see figure 5)

Temporal pattern imposed on a single-stroke bell or a chime.

NOTE — In figure 5, the "on" phase represents the time when the striker mechanism is actuated. The sound produced by the bell or chime will continue at a level which decreases until the striker mechanism is re-actuated.

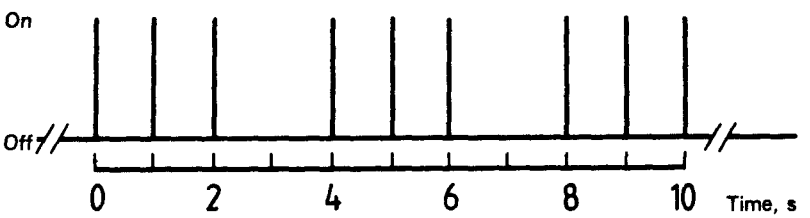


Figure 5 — Example 4

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Doc : No. LTD 05 (1331)

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Printed at Printwell Printers, Aligarh, India